

CLAIMS

[1] A retroreflective sheet for security, comprising: a surface layer; a binder layer; high-refractive-index glass beads; a print resin layer; a focusing layer; a metal layer; and a pressure-sensitive adhesive layer in this order, wherein

the print resin layer forms a mark,

the high-refractive-index glass beads are disposed in the binder layer,

a position for disposing the high-refractive-index glass beads does not coincide with a position of the print resin layer, when being observed from the surface layer side in a thickness direction of the retroreflective sheet for security, and

the print resin layer is made of a composition containing a room temperature curing resin as a main component.

[2] The retroreflective sheet for security according to Claim 1, wherein the binder layer is made of a composition containing a thermosetting resin.

[3] The retroreflective sheet for security according to Claim 1, further comprising a self-destructive layer between the focusing layer and the metal layer.

[4] The retroreflective sheet for security according to Claim 3, wherein the self-destructive layer is made of a resin composition having low adhesion with the metal layer.

[5] The retroreflective sheet for security according to Claim 1, further comprising a self-destructive layer, wherein the pressure-sensitive adhesive layer is disposed between the metal layer and the self-destructive layer.

[6] The retroreflective sheet for security according to Claim 5, wherein the self-destructive layer is a film comprising a hologram or a diffraction grating, or a film obtained by subjecting a fragile film or a supporting film to a regular or irregular releasing treatment.

[7] The retroreflective sheet for security according to Claim 1, wherein the surface layer and the binder layer are made of the same resin composition.

[8] The retroreflective sheet for security according to Claim 1, which can be colored by allowing a sublimable dye to penetrate an inside of an image formation resin layer by heating, wherein

the surface layer comprises: a surface resin layer that has a weak affinity with the sublimable dye and allows the sublimable dye to penetrate; an image formation resin layer having an affinity with the sublimable dye; and a dye migration preventive resin layer for preventing migration of the sublimable dye, in this order from a surface side of the surface layer.

[9] The retroreflective sheet for security according to Claim 8, wherein the dye migration preventive resin layer is a resin layer containing a vinyl resin with a glass transition temperature (T_g) of 70°C or more and a SP value of 9.0 or more as a main component.

[10] The retroreflective sheet for security according to Claim 8, wherein a film thickness of the dye migration preventive resin layer ranges from 1 μm to 100 μm inclusive.

[11] The retroreflective sheet for security according to Claim 8, wherein the dye migration preventive resin layer is a biaxially stretched film that is

stretched by 10% or more in a winding direction and in a width direction respectively.

[12] The retroreflective sheet for security according to Claim 11, wherein
5 a shrinkage ratio of the biaxially stretched film in the winding direction of the film after being heated at 150°C for 30 minutes is 1.0% or less.

[13] The retroreflective sheet for security according to Claim 8, wherein
10 the image formation resin layer is a resin layer containing a low-molecular-weight compound with a molecular weight of 1300 or less in an amount of 0% to 20 wt% inclusive.

[14] An original sheet of a retroreflective sheet for security that is for the
15 retroreflective sheet for security according to Claim 1, comprising: a surface layer; a binder layer; high-refractive-index glass beads; a print resin layer; a focusing layer; and a metal layer in this order, wherein

the print resin layer forms a mark,

the high-refractive-index glass beads are disposed in the binder
layer,

20 a position for disposing the high-refractive-index glass beads does not coincide with a position of the print resin layer when being observed from the surface layer side in a thickness direction of the original sheet of the retroreflective sheet for security, and

the print resin layer is made of a composition containing a room
25 temperature curing resin as a main component.

[15] A method for manufacturing the retroreflective sheet for security
according to Claim 1, comprising:

laminating the binder layer on the surface layer;

30 printing on the binder layer so as to form the print resin layer;

curing the print resin layer at room temperature;

heating the binder layer to a temperature at which the binder layer generates stickiness;

5 embedding the high-refractive-index glass beads in a part of the binder layer where the print resin layer is not formed;

laminating the focusing layer on the binder layer, the print resin layer and the high-refractive-index glass beads;

forming the metal layer on the focusing layer; and

10 forming the pressure-sensitive adhesive layer on the metal layer.

[16] The method for manufacturing the retroreflective sheet for security according to Claim 15, wherein

the surface layer comprises: a surface resin layer that has a weak affinity with a sublimable dye and allows the sublimable dye to penetrate;
15 an image formation resin layer having an affinity with the sublimable dye; and a dye migration preventive resin layer for preventing migration of the sublimable dye in this order from a surface side of the surface layer,

the method comprising laminating the binder layer on the dye migration preventive resin layer.

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[17] An image-added retroreflective sheet for security, comprising:

a surface resin layer that has a weak affinity with a sublimable dye and allows the sublimable dye to penetrate;

a print layer that has an affinity with the sublimable dye and
25 comprises an image formed in a thickness direction of the layer by the sublimable dye;

a dye migration preventive resin layer for preventing migration of the sublimable dye;

a binder layer;

30 high-refractive-index glass beads;

a print resin layer;
a focusing layer;
a metal layer; and
a pressure-sensitive adhesive layer in this order, wherein

5 the print resin layer forms a mark,
the high-refractive-index glass beads are disposed in the binder
layer,

a position for disposing the high-refractive-index glass beads does
not coincide with a position of the print resin layer, when being observed
10 from the surface resin layer side in a thickness direction of the image-added
retroreflective sheet for security, and

the print resin layer is made of a composition containing a room
temperature curing resin as a main component.

15 [18] The image-added retroreflective sheet for security according to
Claim 17, further comprising a self-destructive layer between the focusing
layer and the metal layer.

[19] A method for manufacturing the image-added retroreflective sheet
20 for security according to Claim 17, comprising:

printing on a transfer paper by using an ink containing the
sublimable dye;

contacting an image-formed surface of the transfer paper with the
surface resin layer of the retroreflective sheet for security according to
25 Claim 8;

heat-treating subsequently so as to sublime the sublimable dye,
allow the sublimable dye to penetrate the surface resin layer and form an
image in the image formation resin layer for obtaining a print layer; and
removing the transfer paper.

[20] A method for manufacturing the image-added retroreflective sheet for security according to Claim 17, comprising:

forming, on the surface resin layer of the retroreflective sheet for security according to Claim 8, a releasable ink receptive layer that can
5 display by print, has absorption of the ink containing the sublimable dye on a surface that is not contact with the surface resin layer, can be subjected to heat treatment for sublimating the sublimable dye and allowing the sublimable dye to penetrate the surface resin layer so as to form an image in the image formation resin layer, and can be released in a state of a film from
10 the surface resin layer after the heat treatment;

printing on the releasable ink receptive layer by using the ink containing the sublimable dye;

heat-treating subsequently so as to sublimate the sublimable dye, allow the sublimable dye to penetrate the surface resin layer and form an
15 image in the image formation resin layer for obtaining the print layer; and releasing the releasable ink receptive layer.